IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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TITLE: PERISTALTIC ROTATION PUMP WITH EXACT, ESPECIALLY MECHANICALLY LINEAR DOSAGE

Amendment A: REMARKS

Upon entry of the present amendments, previous Claims 1 - 13 have been canceled and new Claims 14 - 23 substituted therefor. Reconsideration of the rejections, in light of the forgoing amendments and present remarks, is respectfully requested. The present amendments have been entered for the purpose of placing the claim language into a more proper U.S. format and for the purpose of more clearly distinguishing the present invention from the prior art.

In the Office Action, Claims 1, 2, 8 and 9 were rejected under 35 U.S.C. § 102(b) as anticipated by the Monk patent. Claims 3, 5, 7 and 11 were rejected under 35 U.S.C. § 103(a) as being obvious over the Monk patent. A substitute specification in proper idiomatic English was required. The title was object to and a new title was required. The drawings were also objected to.

As an overview to the present reply, Applicant has extensively amended the claim language so as to place the claim language into a more proper U.S. format, including proper antecedent bases and proper structural interrelationships throughout. Any indefinite terminology found in the original claim language has been corrected herein. Additionally, a new Substitute Specification has been provided which clarifies the difficult English translation that was originally provide.

As an over to the present reply, it is important to note that there is a very great difference

between mechanically linear and non-linear dosage. The pumping mechanical linearity means that the instantaneous mass flow rate is constant. On the other side, the pumping mechanical non-linearity involves variation of the instantaneous mass flow in time, although it is temporal average value is maintained also constant. Mechanical non-linearity of pumping in one pumping cycle is primarily caused by cyclical constriction (pressing) of the tubular element at the beginning of the occlusal path. The ejects a non-zero volume from the tubular element 1. Secondarily, mechanically non-linearity of pumping occurs by cyclical release of the pump segment after the end of the occlusal path. This results in a partial backward motion (disturbing) of the ejected (pumped) fluid. In this way non-uniform plus pumping occurs during each revolution.

Linear fluid dosage means that a continued constant volume ejection of the fluid per unit angle of angular displacement of the pump rotor in any part of a rotor revolution. Classical arrangement involving pulsing is describes in the Monk patent. That is why the Monk patent does not split the working path into three partial components and define them geometrically. These components include the lead-in path (the path along which the roller elements rolling start to constrict the tubular element before they are completely released); (2) the occlusal path (the path along which the roller elements rolling on the pinched pump segment eject fluid); and (3) the releasing path (the releasing path along which the roller elements release the pump segment).

The Monk patent has the working path involving angle of revolution of 180 °. It has roller elements and, consequently, three pulses occur during each rotor revolution. The Monk discloses a pulsing peristaltic rotation pump. A pump segment 81 is placed on a working path curved surface 121. The U-shaped wall 116 has, on its upper side, an upwardly facing curved surface 123 (see fig. 3 and column 4, line 51 - 52). Curved surface 121 is not grooved. The flexible tube 81 has its

central portion extending adjacent the surface 121. The tube is pinched between the surface 121 and the roller elements 46 - 48 on the rotor 42 as the rotor 42 rotates so that fluids are conveyed through the tube 81, colun111 5, line 22 - 34.

The peristaltic rotation pump under the Monk patent involves only the concept of the working path. It does not operate with its partia1 sections, i.e. lead-in, occlusal and releasing paths. It has no "supporting occlusal path'" which is elevated in the direction toward the rotor rotation center above the grooved working path. The position of the working path (curved surface 121) changes with respect to the motor shaft 43 and the rotor 42 (see column 5, line 33 - 34).

So as clearly distinguish the present invention, it now defined that there is "an outer housing" having an annular interior surface with a "first supporting surface and a second supporting surface". The surfaces define a working path. A groove is formed in the working path. There is an occlusal surface formed on opposite sides and above the groove. These features are neither shown nor suggested in the Monk patent. The Monk patent does not show the first supporting surface nor the second supporting surface which extend toward the exterior of the outer housing. The tubular element 1 is arranged so as to extend along the working path. The ends of tubular element leaned against and are fixed against the first and second supporting surfaces outside the working path. The tubular element 1 extends entirely around the working path. The pressure rollers roll along the occlusal surface. These rollers simultaneously roll along the tubular element.

As a result of this construction of the present invention, the accuracy of the peristaltic pump achieves: (1) long-term and stable fixation of the tubular element along the working path of the pump; (2) exactly defined distances between the pressure roller and the tubular element at each point along the pump's working path; (3) mechanical splitting of the work path of the pump into three

paths; and (4) mechanically-provided constant increments of the tubular element volume by gradually releasing the pressure roller from the tubular element located by the release path for leading the tubular element out of the occlusal path.

The pumping linearity of the present invention is insured by the removal of negative influence of the particular pressure roller since the pressure rollers is moving on the tubular element at the output from the occlusal path of the pump. In contrast, the peristaltic rotation pump of the Monk patent is just a common type of pulsing pump. It is not provided with an exact fixation of the tubular element into the groove of the working path. It does not involve the construction of the tubular element by the supporting occlusal path. The constant increment of volume in the tubular element in the releasing path per unit revolution of the rotor is not treated by geometric means and by the shape of the supporting occlusal path and the working path. On this basis, Applicant contends that the structure of the present invention, the function of the present invention and the results achieved by the present invention are patentably distinguishable from the prior art.

Herein, independent Claim 14 reflect the limitations of previous independent Claim 1. Dependent Claims 15 - 17 correspond, respectively, to the limitations of previous dependent Claims 2 - 4. Dependent Claim 18 corresponds to the limitations of previous independent Claim 6. Dependent Claims 19 - 21 correspond, respectively, to the limitations of previous dependent Claims 8 - 10. Dependent Claims 22 and 23 correspond, respectively, to the limitations of previous dependent Claim 22 and 23.

In view of the revised specification, it is not necessary to change the original drawings. The numbering is correct in accordance with the present revised specification.

Based upon the foregoing analysis, Applicant contends that independent Claim 14 is now in

proper condition for allowance. Additionally, those claims which are dependent upon this independent claim should also be in condition for allowance. Reconsideration of the rejections and allowance of the claims at an early date is earnestly solicited. Since no new claims have been added above those originally paid for, no additional fee is required.

Respectfully submitted,

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